REMARKS

Claims 1-20 presently appear in this case. No claims have been allowed. The official action of March 17, 2004, has now been carefully studied. Reconsideration and allowance are hereby respectfully urged.

In response to the examiner's objection to the drawings, applicant has amended claim 1 to indicate that element (26) is a "bladed wheel" in both instances identified by the examiner. Applicant has also made corresponding amendments in the specification to establish that "shovel" and "blade" is an interchangeable identification of elements 24, 26 and 32. Applicant has further enclosed a new corrected Fig. 2 identifying element 38 which the examiner noted as not being shown but described in the specification. Applicant respectfully submits that the examiner's objection to the drawings has now been overcome.

As the examiner will note, applicant has amended the specification to provide section headings as suggested by the examiner.

In response to the examiner's objections to claim 13 and rejection of claims 1-19 under 35 U.S.C. § 112, second paragraph, applicant has amended claim 13 to eliminate the multiple dependency problem identified by the examiner, amended the claims to change "shovel wheel" and "shovels" to

-bladed wheel- and -blades- at every occurrence in the claims and amended claim 17 to eliminate the term "preferably <1" to which the examiner had objected. Applicant respectfully submits that the examiner's objection to claim 13 and rejection of claims 1-17 under 35 U.S.C. § 112, second paragraph, have now been eliminated.

The examiner has further rejected claims 1-19 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Meinander "052. Applicant respectfully traverses this rejection especially as applied to the claims as amended.

The claimed invention concerns degassing centrifugal apparatus and especially the construction of the shovels in the shovel wheel in the inlet end of the centrifuge. The special design of blades changes the direction of the incoming fluid so that it is deflected from its axial path and is directed radially towards the peripheral wall of the rotor. As a result of the shape of the blades, the fluid will rotate at **a speed which is faster** than the rotational speed. of the rotating wall itself.

This is primarily attributed to the structural features of the claimed blades, i.e., in claim 1 "an outlet edge (24) directed towards said inner wall ... forming an angle (β) with a line parallel to the center line of said

rotor (20), and further in claim 2, "said leading edge (27) of said arcuate blade (24) forms an angle (α) with a line parallel to the central line of said rotor (20).

This is in contrast to prior art blade which is clearly not formed in the claimed manner (with angles β and α) and which has substantially maintained the axial direction of the incoming fluid and only has ascertained that the incoming fluids finds its way to the walls and rotates on the wall **at the same speed** as the wall itself. Thus, in the prior art solution the relative movement between the fluid and the rotating wall is only an axial flow movement. There is no relative peripheral flow component between wall and fluid in the prior art solutions. The fluid just rotates at the same speed as the wall.

When the fluid according to the claimed invention is deflected from its axial direction, its velocity in the peripheral direction is increased substantially, just like snow on a road which is hit by the arcuate blade of a snow plough and which is forced up and out off the road at a very high velocity.

In the centrifuge, the velocity of the incoming fluid is composed substantially only of an axial component. In the prior art the axial component was substantially maintained and an additional peripheral component was provided

by the rotating blade wheel. Thus, the peripheral component of the fluid on the rotating wall was the same as the peripheral velocity of the rotating wall itself and the energy of the incoming fluid provided the axial component of the fluid flow. Such an axial fluid flow was often very rapid.

A rapid axial flow in an open channel of the kind provided by the hollow rotor of the present invention, having a gas column in the center of the rotor, is subject to a phenomenon called the "hydraulic jump". A hydraulic jump is not normally observed in pumps and centrifuges but it is well known in the flow of canals and pipes. It does not appear in normal pumps since they operate in a filled condition where no hydraulic jump can occur. However, the hydraulic jump has been found by the present inventor to be a problem degassing apparatuses with an open liquid surface and a fast liquid flow.

The problem of the hydraulic jump is discussed at some length in the specification and it will not be repeated herein. It should suffice to state that the hydraulic jump causes turbulence and consumes energy.

Since the claimed invention concerns a degassing apparatus, turbulence is not acceptable since turbulence in the flow mixes in the air into the degassed fluid. Furthermore, the consumption of energy is a major concern in

any industrial process. The hydraulic jump consumes quite a lot of energy. Avoiding or reducing the hydraulic jump saves energy and as such is of major importance, especially in the papermaking industry where huge amounts of water have to be pumped and degassed.

The claimed invention improves the degassing and save energy in a manner which was not obvious for a person skilled in the art based on the recited prior art.

The Meinander '052 reference is the same applicant's earlier invention and is concerned with the degassing of fluids. The main aim in Meinander '052 is to provide a thorough degassing at the pumping of the huge amounts of water circulating in a papermachine.

Thus, it is seen that Meinander '052 does not recognize the problem of a hydraulic jump nor suggests any solution to the problem.

The changed conditions may be utilized for reducing the speed of rotation of the apparatus, for reducing the size of the apparatus or for increasing the capacity of a given apparatus at a given degassing requirement.

The advantages gained in the claimed invention are attributed to the special arcuate design of its blades. The shovels have a leading edge 27 extending generally in the direction of the incoming flow and an outlet edge 29 set at an

angle thereto hindering the axial flow and directing the flow radially towards the rotating wall. The prior art blades or shovels were rather like a "flat hand" mildly directing the incoming flow to the wall so that the fluid rotates with the blades and the wall. The present novel blades are more like a "cupped hand" which prevent the axial flow of the fluid and force the flow to change its direction and to assume a high peripheral velocity so that it rotates faster than the shovel itself.

Both the "flat hand" of the prior art and the "cupped hand" of the present invention may be slightly turned or twisted in the axial direction. However, nobody would have put a cupped hand in front of the flow in the prior art because that would only have hindered the flow to no evident purpose. The claimed invention does hinder the flow and the purpose is to reduce the axial flow thereby reducing the hydraulic jump and to solve a problem which most of the prior art did not even know exist.

As a solution to the problem caused by the hydraulic jump the present invention is unique. A person skilled in the art will obtain no suggestion in the prior art for solving the problem in the present way. The advantages gained by the present invention are substantial. Consequently, it is

believed that the present invention is unique and patentable over the prior art.

Respectfully submitted,

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